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A PUG-HEADED TWO-LINED DAB, *LEPIDOPSETTA BILINEATA*, THE ONLY KNOWN PUG-HEADED FLATFISH

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Knowing my interest in and my work on abnormal flounders, Dr. Carl L. Hubbs of the University of Michigan has kindly presented to the American Museum this interesting little fish for description. It was collected at Meadowdale, Puget Sound, Washington, June 20, 1926, by C. L. Hubbs and L. P. Schultz.

Lepidopsetta bilineata is a dextral flounder found in the north Pacific, ranging from Monterey, California, to Bering Strait, and on the west side down into the Okhotsk Sea. The specimen being studied is evidently a very young fish since it measures but 100 mm. (4 in.) in length and 35 mm. in depth (body only), whereas adults reach a length of 20 inches and a weight of 5 or 6 lbs.

This two-lined *Lepidopsetta* is so named because it has an accessory supratemporal branch of the lateral line extending parallel with the base of the dorsal fin back to the 20th dorsal ray in this specimen. This fish is small, but with the one exception that it is simous or pug-headed, it seems entirely normal (Fig. 1). This deformity has not prevented the safe migration of the left eye to the right side of the head. There is a slight difference in the lengths of the pectoral fins; that of the upper side is 12 mm. long, while the one on the lower or blind side measures but 8.5 mm. However this is entirely normal for flatfishes, and it is well known that the under side pectoral, being less used than the upper fin, is smaller.

The lower jaw seems normal in length, but, judging by the published figures of the normal fish, it is entirely too thick and stubby. The front part of the head and most of the upper jaw are lacking (Fig. 1). The premaxillaries and maxillaries are greatly crumpled and distorted so that the twisted mouth lies wholly to the left of a plane continuing the mid-dorsal crest onto the central point of the lower jaw. This is shown somewhat in Fig. 2, from a photograph of the left, lower, or blind side of this little fish. To make these relationships clearer, and to show just how grotesque is the head in front view, Fig. 3 has been drawn. In it one

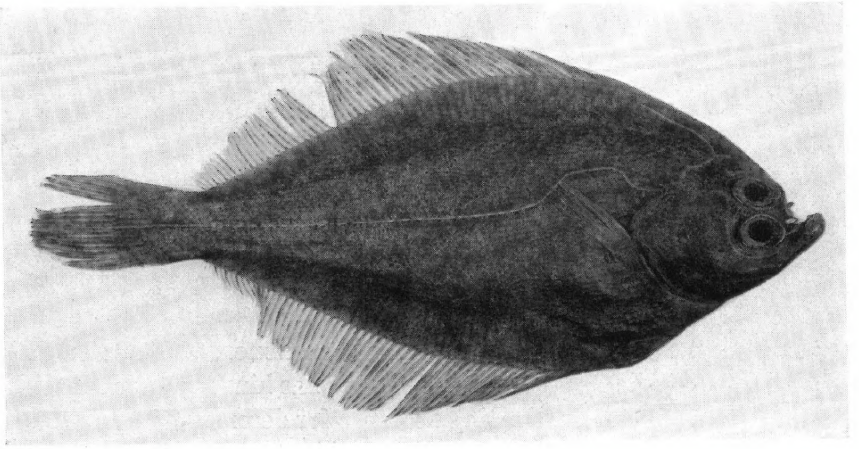

Fig. 1. Right or upper side of the pug-headed dab, *Lepidopsetta bilineata*. Note that the front upper head is lacking, that the eyes, closely juxtaposed, are protuberant, and that the nostrils are out of place.

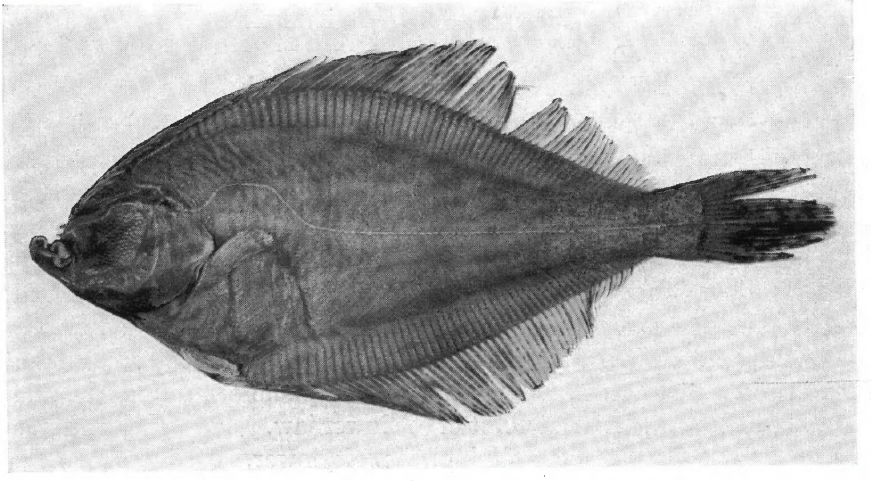

Fig. 2. Under side of the two-lined dab. Note the accessory lateral line, the absence of the front upper head, and the contorted mouth displaced to the left side.

looks at the fish from in front and above—at an angle of about 45° to the plane of the backbone. The upper jaw looks as if the bones had been shoved downward in the center of the jaw in such a way as to curl the median parts downward and inward like two fishhooks turned upside down and with their barbed points brought close together. This upper jaw is surely an extraordinary teratological structure.

Accompanying the loss of the front part of the head, and the reduction, crumpling, and twisting of the upper jaw, other teratological conditions of the head structures have been brought about. The rotated eye is normally found close to the median ridge of the fish's head. Here, as Figs. 1 and 3 show, it has come safely across the dorsal crest but barely

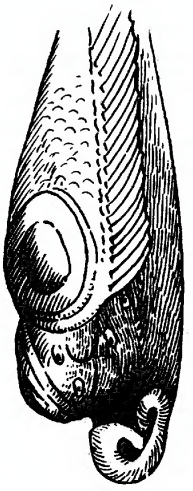

Fig. 3. Front view of head looked down on at an angle of about 45°. The crumpled mouth is on the left side, and behind it is a deep fossa, the rotated eye is barely over the dorsal crest, the right eye overhangs the fossa, and the nasal openings are out of place.

so. Its left edge almost touches the bases of the dorsal fin rays. The two eyes are normally set close to each other but here they are in absolute juxtaposition. The nasal apertures of the right side are normally one behind the other about in the plane of the lateral line. Here they stand at about an angle of 45° to the plane in which the figure is drawn—the horizontal plane of the body as the fish lies on the bottom. The narial apertures of the left side are even more displaced. These openings on the blind side are normally placed much higher toward the median ridge than those on the eyed and colored side. In our fish, however, the lower or anterior is placed squarely on the median crest (or in the vertical plane of the body). The hinder one is on the left side of the body but high up and just to the left of the front edge of the base of the dorsal fin.

In and around these nasal organs are various rugosities as shown in Fig. 3.

The mouth is strongly up-tilted in front. Behind it is a fossa, fairly shallow on the left but very deep on the right side. The hard parts fall away so abruptly that at this angle the right or lower eye completely overhangs the lower part of the right side of the head. At this angle the lower eye seems to look downward, but this is not true as Fig. 1 shows.

What this little fish fed upon cannot be said, but it surely has managed to get food enough to attain a length of 100 mm. (4 inches). That it did not feed so easily nor grow so fast as its normal brothers did may be accepted as a sound inference. But the fish looks fat and well fed, and is probably two or more years old. If one could only have followed its development from the time of hatching!

During the years that I have been engaged in studying abnormalities in flatfishes, about 175 specimens have passed through my hands. Furthermore, during this time, I have studied the figures and descriptions in the literature of every abnormal flatfish of which I could get even a hint. In these hundreds of figures and descriptions, there seems never before to have been seen and figured a bulldog-headed flatfish. This little bilineate dab is a unique specimen—the only one known.

As to the cause of this anomaly, one is puzzled. It is known that in pug-headed fishes, as in pug-headed dogs, this condition is due to failure to develop of the parasphenoid bone, the great bone forming the basis cranii. This failure to elongate ties down into a snub-nosed form the whole front end of the head, while the lower jaw goes on in normal development. There is, however, a very marked variant to this. Sometimes pug-headed dogs and fishes have very protuberant eyes—as does our fish (Figs. 1 and 3). In this case, and in exaggerated ones in any round-bodied fishes, the eyes are enlarged and so protuberant that they seem almost ready to "pop out of the head." This combined condition of exophthalmic eyes and pug-headedness is due to the same cause. The parasphenoid instead of elongating normally, or growing straight forward even though shortened, has "buckled up" into the cavity in the head (normally between the eyes) and has produced a marked exophthalmia. What is the condition of the bones in the anterior part of the skull in this little fish can only be conjectured, but the exophthalmia is present as may be seen in Fig. 1. Such exophthalmia has possibly never been seen before in a flatfish; certainly it has not been described previously.

As to what causes the failure of the parasphenoid to develop or what leads to the weakness which causes it to buckle up, one must again con-

jecture. It is commonly believed that these things are the product of a glandular disturbance—probably in the pituitary.

In this little dab, there is quite a list of abnormalities consequent upon the failure of the parasphenoid to develop. These are: the front part of the upper head is lacking; the upper front jaw is crumpled inward and downward; the mouth is twisted to the left; there is a marked cavity or depression behind and to the right of the upper jaw; both sets of nostrils are very much displaced; the left eye is barely over the dorsal crest, and the two eyes are protuberant and are jammed so closely together that there is hardly any line of demarcation between them. The amount and extent of deformation of the head and mouth of this fish are surely at a maximum.